Fall 2019

CE 351-101: Introduction to Transportation Systems

Kitae Kim

NEW JERSEY INSTITUTE OF TECHNOLOGY
Department of Civil and Environmental Engineering
CE 351 – Introduction to Transportation Systems, Fall 2019
Section: 101

Meeting Time and Location:
Thursday 6:00 PM – 9:00 PM, Electrical & Computer Engineering Centre (ECEC) 100

INSTRUCTOR:
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OFFICE HOURS:
Thursday 4:00 pm ~ 6:00 pm or by appointment

Prerequisites: CE 200, CE 200A, CE 350 A study of the principal modes of transportation, with emphasis on the planning, design and construction of facilities for modern transportation systems.

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:
http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

COURSE DESCRIPTION:

Problems in modern transportation systems will be introduced. The course will cover transportation planning and traffic engineering issues on highways and urban streets, while traffic simulation and animation will be applied to help students identify the problems. The concepts of highway (e.g., freeways, arterials and urban streets) operations and capacity, speed-flow-density relationships, traffic flow theory, ramp and weaving sections will be introduced prior to computer simulation analysis. The concepts of bus transit capacity and service quality as well as bus transit scheduling problems will be introduced.

TEXTBOOK:

- Fred L. Mannering, Scott S. Washburn, ***"Principles of Highway Engineering and Traffic Analysis,"*** 6th Edition, John Wiley & Sons, Incorporated, ISBN 978-1-1181-2014-9

RECOMMENDED READINGS:

- Nicholas J. Garber and Lester A. Hoel, "Traffic and Highway Engineering", Cengage Learning, 5th edition, January,2014
- Roger P. Roess, Elena S. Prassas, and William R McShane, "***Traffic Engineering***," 4th Edition, Englewood Cliffs, NJ., Prentice Hall, 2010 (ISBN-10: 0136135730 and ISBN-13: 978-0136135739)
- Transportation Research Board, "***Highway Capacity Manual (2010)***", National Research Council, 2010
- TSIS – "***CORSIM Manual***", McTrans, University of Florida
- Transit Capacity and Quality of Service Manual, 3rd Edition, TCRP Report 165, TRB, 2013

STUDENT EVALUATION/GRADE DISTRIBUTION:

5% - Class attendance and participation
25% - Home works
20% - Term Project
25% - Midterm Exam
25% - Final Exam

FINAL GRADE:

Score	90 - 100	84 -89	76 - 83	68 to 76	60 to 68	50 to 60	0 to 50
Grade	A	B+	B	C+	C	D	F

TENTATIVE COURSE OUTLINE (SUBJECT TO MODIFICATION)

Date	Topic	Required Reading	Home Work/Project	
			Assigned	Due
9/5	Course Introduction			
9/12	Transportation Systems – An Overview: Characteristics Problems in Modern Transportation Systems	Supplementary Material	HW#1	
9/19	Transportation Systems – Components Infrastructure/Vehicles/Human	Chapter 1, 2/ Supplementary Material	HW#2	HW#1
9/26	Travel Demand and Traffic Forecasting – Four Step Process	Chapter 8	HW#3	HW#2
10/3	Travel Demand and Traffic Forecasting – Traffic Forecasting in Practice	Chapter 8		HW#3
10/10	Freeway – as part of transportation systems	Supplementary Material		
10/17	**Midterm Exam**			
10/24	Freeway – as part of transportation systems Capacity Analysis and System Failure	Chapter 6	HW#4	
10/31	Arterial – as part of transportation systems (Urban Street Systems and Traffic Control)	Chapter 7	HW#5	HW#4
11/7	Transit – as part of transportation systems	Supplementary Material		HW#5
11/14	Transit – as part of transportation systems (Capacity Analysis and System Failure)	Supplementary Material	HW#6	
11/21	**Project** – System Failure – Scenario Analysis and Evaluation (Lab-1)			HW#6
12/5	**Project** – System Failure - Scenario Analysis and Evaluation (Lab-2)			
12/12	Project Presentation/Final Exam Review			

12/19	**Final Exam**			
12/20	Final Project Report Due			Project Report

GENERAL RULES, REQUIREMENTS AND ANNOUNCEMENTS:

1) Class attendance is required (An attendance sheet will be passed around at the beginning of each class).
2) No late home-work and project report will be accepted unless there is a valid (e.g. medical) reason for late submittal. Home-works and project report are due at the beginning of the class on the designated dates. Carelessly written and disorganized homework and project will not be graded.
3) In addition to textbook chapters, lecture notes/supplementary materials/web-documents (web-links) provided electronically or in class are required readings

Course Objectives Matrix -CE 351- Introduction to Transportation Systems

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Develop skills for analysis of travel demand forcasting.			
Apply the demand and traffic forcasting techniques and metholodogies	1	1	Homework project report
Student Learning Outcome 2: Analysis and evaluate traffic flow			
Determine the capacity of a transportation system	1	1	Homework project report

CEE Mission, Program Educational Objectives and Student Outcomes
The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our program educational objectives are reflected in the achievements of our recent alumni:

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Alumni will advance their skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 2/13/18